The present invention has been described in connection with certain structural embodiments and it will be understood that various modifications can be made to the above-described embodiments without departing from the spirit and scope of the invention as defined in the appended claims.

What is claimed is:

1. A liquid cooled heat sink for cooling a heat generating component in contact therewith, comprising:

a heat sink base member having an open ended channel formed in one surface thereof, said channel including a curved lower wall and a pair of side walls, each sidewall having a first end continuous with said curved lower wall and a second end terminating at said surface, said sidewalls being tapered from said first ends to said second ends, the open end of the channel having a span less than a span across a lower portion of the channel; and

a fluid conduit constructed of a thermally conducting material and disposed in said channel, said fluid conduit being disposed in said channel and having an outer span greater than the span across the open end of the channel for maintaining said fluid conduit in said channel by a friction fit formed between said side walls and said fluid conduit, said fluid conduit having a flattened surface which is substantially coplanar with said one surface of said heat sink base member, the heat generating component being disposed in use in direct contact with said one surface of said heat sink base member and in overlying abutting relation with said flattened surface for establishing direct thermal contact between the heat generating component and said flattened surface.

2. A heat sink as claimed in claim 1, further comprising an adhesive disposed in said channel for holding said fluid conduit in said heat sink base member and for providing good thermal conductivity between a heat generating component and said fluid conduit.

3. A heat sink as claimed in claim 1, wherein said heat sink base member includes channel on two sides of said heat sink base member.

4. A heat sink as claimed in claim 3, wherein said channels are disposed on opposite sides of said heat sink base member.

5. A heat sink as claimed in claim 4, wherein said fluid conduit is disposed on alternative sides of said heat sink base member as the fluid conduit is positioned in said channel.

6. A heat sink as claimed in claim 1, wherein said heat sink base member is made of at least one of aluminum and aluminum alloy and said fluid conduit is made of at least one of copper and copper alloy.

7. A heat sink as claimed in claim 1, wherein at least one of said channels includes a local deformation rising from a surface of said one channel and said fluid conduit includes a local deformation directed toward the inside of said fluid conduit, said local deformation in said one channel and said local deformation in said fluid conduit being disposed adjacent to one another.

8. A liquid cooled heat sink for cooling heat generating components, comprising:

a heat sink base member having channels formed in at least one surface thereof;

a fluid conduit disposed in said channels, said fluid conduit having a flattened surface which is substantially coplanar with the surface of the heat sink base member having the channels therein, wherein at least one of said channels includes a local deformation rising from a surface of said at least one channel and said fluid conduit includes a local deformation directed toward the inside of said fluid conduit, said local deformation in said at least one channel and said local deformation in said fluid conduit being disposed adjacent to one another, and wherein said local deformation in said at least one channel is a ridge extending transverse to the direction of said fluid conduit.

9. A liquid cooled heat sink for cooling a heat generating component in contact therewith, comprising:

a heat sink base member having an open ended channel formed in one surface thereof, said channel including a curved lower wall and a pair of side walls, with each sidewall having a first end continuous with said curved lower wall and a second end terminating at said surface, said sidewalls being tapered from said first ends to said second ends so that the open end of the channel has a span less than a span across a lower portion of the channel; and

a fluid conduit constructed of thermally conductive material and disposed in said channels, said fluid conduit having a flattened surface which is substantially coplanar with said one surface of the heat sink base member and in direct contact with the heat generating component, wherein said channel includes a local deformation rising from a surface of said channel and said fluid conduit includes a deformation directed toward the inside of said fluid conduit, said local deformation in said channel and said local deformation in said fluid conduit being disposed adjacent to one another.

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10. A heat sink for cooling a heat generating component in contact therewith, comprising:

a heat sink base member having an open ended channel formed in a first surface thereof, said open ended channel including a curved lower wall and a pair of side walls, each side wall having a first end continuous with said curved lower wall and a second end terminating at said first surface, said side walls being tapered inwardly from said first ends to said second ends, the second ends of said side walls having a span less than a span across a lower portion of said channel; and

a tubular fluid conduit constructed of a thermally conducting material and disposed in said channel, said fluid conduit having a starting diameter larger than the depth of the channel and being disposed in said channel by being deformed using the channel as a mold, wherein following deformation the portion of said fluid conduit formerly disposed above said channel has a flattened surface which is substantially coplanar with said first surface of said heat sink base member, whereby the heat generating component may be disposed in direct contact with said first surface of said heat sink base member and with said flattened surface of said conduit for establishing direct thermal contact between said heat generating component and said flattened surface.

11. The heat sink according to claim 10, wherein after deformation of said tubular conduit, an outer span of the portion of the fluid conduit disposed in said channel is greater than the span of said open end of said channel.

12. The heat sink according to claim 10, further comprising:

an adhesive disposed in said channel.

13. The heat sink according to claim 12, wherein after deformation of said tubular conduit, an outer span of both the portion of the fluid conduit disposed in said channel and the adhesive disposed in said channel is greater than the span of said second ends of said side walls of said channel.

14. The heat sink according to claim 10, further comprising a further open ended channel formed in a second surface of the base member, said further channel including a curved lower wall and a pair of side walls, each side wall having a first end continuous with said curved lower wall and a second end terminating at said second surface, said side walls being tapered inwardly from said first ends to said second ends, the second ends of said side walls having a span less than a span across a lower portion of said further channel.

15. The heat sink according to claim 14, wherein said first surface and said second surface of said heat sink base member are opposite one another.

16. The heat sink according to claim 10, wherein said heat sink base member is made from one of aluminum and aluminum alloy; and

said fluid conduit is made from one of copper and copper alloy.

17. The heat sink according to claim 10, wherein a cross section of said tubular conduit is one of d-shaped, circular, and square.

18. The heat sink according to claim 17, wherein said cross section is circular.

19. A method of forming a heat sink suitable for cooling a heat generating component, comprising the steps of:

providing a heat sink base member having an open ended channel formed in a first surface thereof, said channel including a curved lower wall and a pair of side walls, each side wall having a first end continuous with said curved lower wall and a second end terminating at said first surface, said side walls being tapered inwardly from said first ends to said second ends, the open end of said channel having a span less than a span across a lower portion of said channel;

providing a tubular fluid conduit being constructed of a thermally conducting material and having a diameter larger than a depth of said channel;

positioning said fluid conduit into said channel so that a portion of the fluid conduit extends above the first surface of the heat sink base member; and

deforming said fluid conduit using the channel as a mold for rendering said portion substantially coplanar with the first surface of said heat sink base member, for disposing and maintaining said fluid conduit in said channel, whereby the heat generating component may be disposed in direct contact with said first surface of said heat sink base member and with said flattened surface of said conduit for establishing direct thermal contact between said heat generating component and said flattened surface.

20. The method according to claim 19, wherein an outer span of the portion of said fluid conduit disposed in said channel is greater than the span of said open end of said channel.

21. The method according to claim 19, further comprising the step of:

disposing an adhesive in said channel at least one of before, during and after said positioning step.

22. The method according to claim 21, wherein after deformation of said tubular conduit, a combined outer span of both the portion of the fluid conduit disposed in said channel and the adhesive disposed in said channel is greater than the span of said open end of said channel.

23. The method according to claim 19, wherein said heat sink base member is made from one of aluminum and aluminum alloy; and

said fluid conduit is made from one of copper and copper alloy.

24. The method according to claim 19, wherein a cross section of said tubular conduit is one of d-shaped, circular, and square.

25. The method according to claim 23, wherein said cross section is circular.

26. A method of forming a heat sink suitable for cooling a heat generating component, comprising the steps of:

providing a heat sink base member having a first surface and a second surface, wherein a first open ended channel is formed in said first surface, a second open ended channel is formed in said second surface, each of said channels including a curved lower wall and a pair of side walls, each side wall having a first end continuous with said curved lower wall and a second end terminating at said one surface, said side walls being tapered inwardly from said first ends to said second ends, the open ends of said channels having a span less than a span across a lower portion of said channels;

providing a first tubular fluid conduit and a second tubular fluid conduit, each conduit being constructed of a thermally conducting material and having a diameter larger than a depth of said channels;

positioning said first conduit into said first channel so that a portion of the first conduit extends above the first surface of the heat sink base member;

positioning said second conduit into said second channel so that a portion of the second conduit extends above said second surface of the heat sink base member;

deforming said first conduit using said first channel as a mold for rendering said portion of said first conduit substantially coplanar with said first surface of said heat sink base member for disposing and maintaining said first conduit in said first channel; and

deforming said second conduit using said second channel as a mold for rendering said portion of said second conduit substantially coplanar with said second surface of said heat sink base member for disposing and maintaining said second conduit in said second channel, whereby a first heat generating component may be disposed in direct contact with said

first surface of said heat sink base member and with said flattened surface of said first conduit for establishing direct thermal contact between said first heat generating component and said flattened surface of said first fluid conduit, and whereby a second heat generating component may be disposed in direct contact with said second surface of said heat sink base member and with said flattened surface of said second conduit for establishing direct thermal contact between said second heat generating component and said flattened surface of said second fluid conduit.

27. The method according to claim 26, wherein after the deforming step, said first conduit disposed in said first channel has a first outer span, said second conduit disposed in said second channel has a second outer span, wherein at least one of said first outer span and said second outer span is greater than the span of said open end of said first channel and the span of said open end of said second channel, respectively.

28. The method according to claim 26, further comprising the step of:

disposing an adhesive in at least one of said first channel and said second channel at least one of before, during and after said positioning steps.

29. The method according to claim 28, wherein after deformation of said first and second tubular conduits, said portion of the first conduit and said adhesive disposed in said first channel has a first outer span, said portion of the second conduit and said adhesive disposed in said second channel has a second outer span, wherein at least one of said first outer

span and said second outer span is greater than the span of said open end of said first channel and said open end of said second channel, respectively.

30. The method according to claim 26, wherein said heat sink base member is made from one of aluminum and aluminum alloy; and

said fluid conduit is made from one of copper and copper alloy.

31. The method according to claim 26, wherein a cross section of at least one of said tubular conduits is one of d-shaped, circular, and square.

32. The method according to claim 26, wherein said cross section is circular.